



Technical Newsletter

System S360-01

Re: Form No. A24-3231-1

This Newsletter No. N24-0365

Date: June 17, 1966

Previous Newsletter Nos. None

Replacement pages for IBM System/360 Model 30 Functional Characteristics,
Form A24-3231-1.

To bring your publication up to date, please replace the following pages with the
corresponding pages attached to this Newsletter. Changes are indicated by a vertical
line at the left of the affected text and by a dot (●) at the left of the figure title of the
affected figure.

Pages

43 and 44

45 and 46

47, 48 and 48.1

51, 51.1 and 52

53 and 54

55 and 56

Store

Pressing the store button (Figure 19, lower left) causes the contents of the data switches (switches H and J) to be gated to the area selected by the display-store selection switch (switch E). If one of the core storage areas is selected, the address is contained in switches A, B, C, and D. The store switch is inoperative if the system clock is running.

It is also not possible to store into main or auxiliary storage if the ALLOW WRITE indicator is on (refer to the STATUS subsection of the Basic CPU section).

Display

The purpose of the display button (Figure 19, lower left) is to cause the selected byte (using switch E) to be gated to a display register. The display switch is inoperative if the system clock is running. For display operations involving storage, the ALLOW WRITE indicator must also be off before the display button is active.

INT TMR

This is a two-position toggle switch (Figure 19, lower left) installed on the pushbutton panel whenever the Interval Timer feature is installed. In the ON position, the interval timer is allowed to generate program interrupts. In the OFF position, the interval timer is ignored.

Interrupt

Pressing this button (Figure 19, OCP section) generates a console interrupt, which the system recognizes if programmed to do so.

Load

When the load button (Figure 19, OCP section) is pressed, a system reset is generated. When released, the clock is started and an initial-program-load routine is initiated.

Read-Only Storage Indicators

In general, these indicators (see Part 1, Figure 20) are for customer engineering use. Therefore, only a short description of each ROS field is presented here.

- CN, CH, CL

These fields provide the address of the next ROS word to be executed.

- CA, CF, CB, CG, CV, CC

These fields control operation of the ALU.

- CD

This field selects one of several registers to receive the output of the ALU. A given register can be used as both a source and a destination during a single ROS cycle.

- CK

This field provides a source of data and control bits.

- CM CU

These two fields control core-storage operation. They determine which of the storages (main or auxiliary) is to participate in a particular read or write operation.

- LP

This indicator, located between the ADR and W Register labels on the top row of indicators, lights when the air pressure to the ROS unit is too low. The customer engineer should be called whenever this indicator is on.

- W and X Registers

These indicators display the address of the ROS word being used.

- Checking

Bits are provided for parity checking (that is, ADR, SA-P, CR-P).

IBM 2030 Use Meters

The 2030 console is provided with two direct-reading meters that measure operating time: a customer's meter and a customer engineer's meter. The position of a key switch determines whether the customer's meter or the CE meter is operating. The customer engineer holds the key for this switch; and whenever he is performing either scheduled or unscheduled maintenance in the CPU, he will set the switch to cause the CE meter to operate. One of these meters (determined by key switch setting) operates whenever the CPU clock is running and either:

1. The CPU is not in the wait state or,
2. There is an interrupt pending.

The *system* indicator is on when either of the meters is running.

IBM 1050 Documentary Console

The IBM 1052 Printer Keyboard is the basic console keyboard printer for the System/360 Model 30. Communication between operator and program is, therefore, effected through the 1052. Besides the 1052, a variety of IBM 1050 console devices is available to increase the flexibility of the system. These devices (including the 1052) are attached to the IBM 2030 Processing Unit through an IBM 1051 Control Unit and the 1051 Attachment, which is located in the 2030.

The maximum number of 1050 console devices attachable through this feature are:

- One keyboard
- Two printers
- One reader (either card or paper tape)
- One punch (either card or paper tape).

These devices can be operated separately from the 2030 (even if CPU power is off) on a 24-hour basis. Additional use-rental is not charged for the 2030 while the 1050 devices are used in this manner. This kind of operation is called *off-line* (off-line signifying that the 1050 devices are not being used in operations that affect the 2030). Off-line operation provides for media conversion (such as transferring data from card to paper tape), card or paper tape listing or preparation, and other 1050 operations that do not depend on 2030 functions. Interdependent operations between the 2030 and the console devices are termed *on-line* operations. An example is an operator request for information from the 2030 by means of the IBM 1052 Printer Keyboard.

Additional flexibility is gained through an inexpensive data communications link (when a 1051 model 1 with the master station feature is used). Here the local 1050 devices (physically located near the 2030) can exchange information with up to 26 remote 1050 terminals. This communication link can be operated off-line only. That is, messages sent and received by the local 1050 devices are not controlled and not sent or received by the 2030. The local 1050 I/O devices not being used in the data communications link can, however, be operated on-line with the 2030. This operation can occur at the same time as the off-line data communications operation.

To distinguish between data communications operations and local operations, we use the terms *line loop* and *home loop*. *Home loop* 1050 device operations can

be on-line to the 2030 or off-line, as already described, among the local 1050 devices. *Line loop* refers to operations on the communications line. These operations can occur only between local 1050 devices and remote 1050 terminals that all operate off-line to the 2030.

To summarize:

1. *On-line* refers to operations between devices and the 2030.
2. *Off-line* refers to operations that do not involve the 2030.
3. *Home loop* refers to operations on a local basis, either on-line or off-line.
4. *Line loop* refers to communications line operations.

Because the usage of I/O devices can become critical in time-dependent applications, it is important that the programmer fully understands the meanings of the terms on-line and off-line.

Multiplexor Channel Address

The unit address of the 1050 console is a fixed multiplexor channel address. In a 2030 with 8,192 positions of main storage, the 1050 console address is always 1F (hexadecimal). System/360 Model 30 Processing Units that have 16,384 or more positions of main storage use address 1F or 5F for the 1050 console (one or the other, not both). This arrangement allows for the possibility of two systems connected through the channel to channel adapter. For example, if a system with 16,384 storage positions is connected to a system with 8,192 storage positions, then the address both systems use for the 1050 console is 1F. Hence communication is provided to a console from either system.

If a system has the 224 subchannels feature, then the console address can be 1F, 5F, or DF (only one, not any combination). The 1050 attachment can be selectively assigned to be first or last in terms of multiplexor channel polling priority.

Configurations

All 1050 documentary console devices are attached to the 2030 through the 1051 Attachment in the 2030. Automatic translation is provided between the 1050 PTTC/EBCD and the 2030 EBCDI code. Alter, display, and hexadecimal conversion functions are performed by programming.

The IBM 1051 Control Unit controls the local 1050 devices. Within the 1051 are the various 1050 I/O adapters, controls, and power supplies. The IBM 1057 Card Punch is an exception in that it contains its own power supply.

Either of two models of the 1051 can be used with the 2030. The 1051 Model N1 (home loop only) provides for on-line or off-line operation of local 1050 I/O components. The 1051 Model 1 also provides for on-line or off-line operation of local 1050 components on the home loop and provides for line-loop operation of local 1050 devices with remote 1050 terminals.

Note: This communication link is off-line to the 2030 only.

The IBM 1052 Printer Keyboard has all the necessary control switches and lights for normal 1050 operations only and for operations involving the 1050 and 2030. For possible configurations not requiring a 1052, a 1050 switch unit is required.

Various configurations of IBM 1050 devices with the 2030 are possible. Three examples of the configurations are presented here.

- Basic printer keyboard
- Maximum home loop
- Off-line communication (line loop).

Basic Printer Keyboard Configuration (Figure 22)

This configuration operates on-line with the 2030 or off-line except when the 2030 is in an emergency power-off condition.

Note: All configurations can operate off-line, even with normal power off. If the 2030 emergency-pull switch is operated, power to 1050 documentary console devices is lost. However, the CE can bypass the emergency-pull switch so that 1050 devices can be operated with the emergency-pull switch operated. If 1050 devices are so operated, in emergency-pull bypass, power is dropped to these devices when the emergency-pull switch is reset by the CE. Here, the CE must return the 1050 devices out of emergency-pull bypass mode.

Maximum Home-Loop Configuration (Figure 23)

With this configuration, the program can select and read from a 1054 or 1056 reader. Also, the following

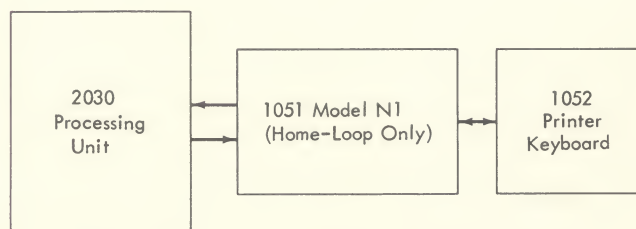


Figure 22. Basic Printer Keyboard Configuration

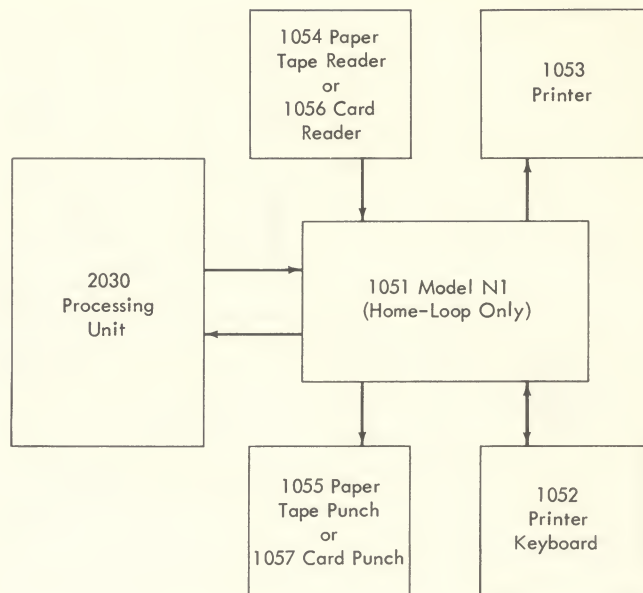


Figure 23. Maximum Home-Loop Configuration

operator-initiated inputs to the 2030 can be accommodated:

1. Keyboard to 2030.
2. 1054 Paper Tape Reader to 2030.
3. 1056 Card Reader to 2030.
4. Split input to 2030. That is, data is entered from the keyboard alternately with data from the 1054 or 1056 all in a single read operation.

If the 1050 Home Component Recognition feature is used, the program can select one or any combination of the three types of outputs (1052, 1053, and 1055 or 1057, for example). It can change the output selection any place in the data stream during any single write operation. The program can change ribbon color and line-feed spacing at any point in the data stream when the 1051 Automatic Ribbon Shift and Line Feed Select feature is installed.

This complete 1050 system can operate off-line, performing any normal 1050 home-loop operations not requiring the 2030.

Off-Line Communications Configuration (Figure 24)

The home-loop and line-loop communications functions shown in Figure 24 can be performed simultaneously if the same I/O component is not required by both loops.

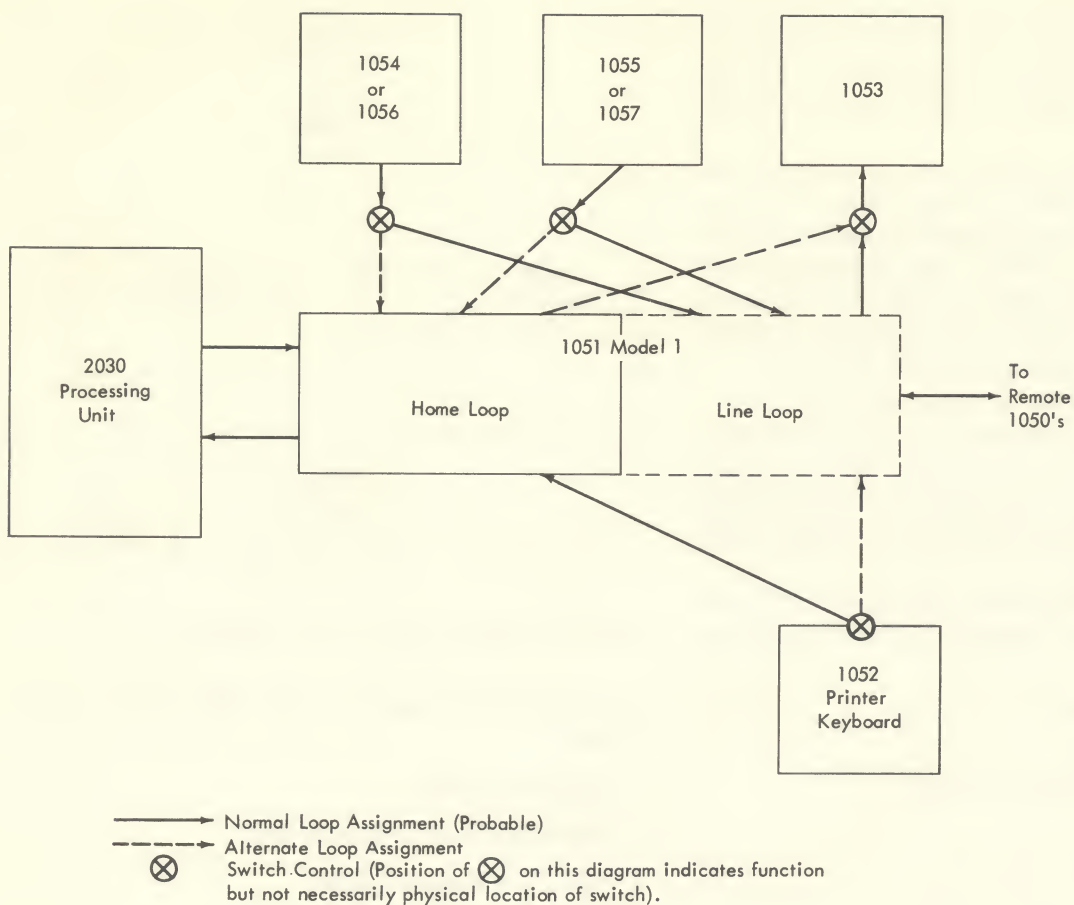


Figure 24. Off-Line Communications Configuration

IBM 1050 Lights, Switches, and Functional Keys

The following describes the 1050 lights, switches, and functional keys for on-line 1050 home-loop operation.

The Keyboards shown in Figures 25, 26, and 27 indicate graphics controlled by particular keys. The actual keyboards, however, do not show the lower-case alphabetic characters. The IBM 1050 Keyboard Printer models that can be used with System/360 Model 30 are:

1. Model 3 (Figure 25) is used whenever the IBM 1051 Model 1 Control Unit is used in the console configuration.
2. Model 5 (Figure 26) is used with the IBM Model N1 Control Unit when 1050 I/O components or features requiring switches (in addition to the 1052 printer keyboard) are used in the system.
3. Model 6 (Figure 27) is used with the IBM 1051 Model N1. Model 6 does not provide the switch-control capability for adding other 1050 I/O devices or features that require switches.

The 1052 Model 6 can be obtained only on an "as available" basis. (See your IBM representative.)

If the Systems Console Attachment Feature is installed in the 1051 Model N1 and in the 1052 Model 6, certain functions are inoperative:

- a. When a command is sent to the Model 6 to tab, backspace, or line feed, the Model 6 spaces.
- b. No action occurs when a ribbon shift and line feed select is received by the Model 6.
- c. Tab, backspace, and line feed keys do not function.

Any programs that provide for any of these functions will operate, but the functions will not be performed.

4. The 1052 Model 8 (Figure 27.1) is used with the IBM 1051 Model N1 and replaces the 1052 Model 6 as the standard console keyboard. Model 8 provides the basic mechanisms and functions necessary in a system console environment. This model provides switch control for the basic IBM 1052 Printer-Key-board, but it does not provide the capability for adding other 1050 I/O devices or features that require switches. The 1052 Model 8 uses only the commands used by the 1052 Model 6. Therefore, no additional coding is necessary to support the 1052 Model 8.

The Tab, Backspace, and Line-feed keys are blank, and the functions associated with these keys are not provided in the 1052 Model 8. Also, no action occurs when a ribbon shift and line feed select is received by the 1052 Model 8. Any problem program written to control these functions operates with Model 8, even though the functions are not performed. Whenever one of the codes representing one of these functions is sent to the Model 8, a space with no printing occurs. Prefix codes are accepted by the 1051 with attached 1052 Model 8, but both the prefix character and the printable character in the prefix sequence are ignored.

The following items are standard on the Model 8:

- a. A 13½ inch pin-feed platen,
- b. A 12½ inch (maximum) printing line,
- c. Six lines per inch line-feeding, and
- d. Character spacing of ten per inch.

No additional special features are available for the Model 8.

Also, the following functions and manual controls are removed or inoperative on the Model 8:

- a. Left and right margin set (the left and right margins are fixed),
- b. Single-double index lever,
- c. Paper release bar,
- d. Tab clear-set lever,
- e. Ribbon shift lever,
- f. End-of-line bell, and
- g. Pressure feed rolls

The Systems Console Attachment Feature is required (in the 1051 Model N1) to attach a 1052 Model 8.

CPU Connect Switch

CPU On: In the CPU-on position, this switch connects the 1050 to the CPU. If all dc power is on in the 1051 when this switch is thrown to the ON position, a 1050 operational signal results. A transition from 1050 not-operational to 1050 operational ini-

tiates a 1050 ready interrupt with the device-end bit on in the Channel Status Word (CSW).

CPU Off: In the OFF position, this switch takes the 1050 system completely off-line. Any 1050 read or write commands are then rejected with condition code 3 (device not operational). When the CPU connect switch is returned to the home or ON position, a ready condition interrupt with device-end status is initiated.

Request Key

Pressing the request key causes an attention status to be established in the 1051 attachment. The 1051 attachment holds this attention status until the 1051 attachment becomes idle and available, at which time an attention interrupt is initiated in the CPU.

Proceed Light

The proceed light indicates that the 1051 attachment channel is available for operator-initiated keyboard and/or Reader-2 (that is, the other attached card or paper-tape reader, *not the 1052*) input through the 1051 home loop. When the proceed light is on, the keyboard is unlocked and an interlock is removed from Reader 2.

System Program/Duplicate Switch

Program Position: Two-character program-control sequences from any source cause the proper component control. The two-character sequences are not printed or punched. During a read command, neither character of a two-character control sequence is stored.

With the 1051 Home Component Recognition feature, an output other than the first printer must have its home-component-recognition latch turned on by a two-character program control sequence as well as having its assignment switch in the HOME position to satisfy the output select and ready interlock to the 1051 attachment during write commands.

Duplicate Position: With this switch in the DUPLICATE position—

1. Manual component assignment is required, and the 1051 Home Component Recognition special feature is not effective.
2. The prefix code is not printed or stored, but it is punched. The following numeric or alphabetic character is then stored, printed, and punched.

3. The output select and ready interlock to the 1051 attachment is not dependent upon any of the output home-component-recognition latches being on.

Auto-Fill Switch (with the 1051 Auto-Fill Character Generation Special Feature)

In the ON position, fill characters (idle code) are automatically generated by the 1051 during the execution time of printer functions such as new line and tab. Write commands are interlocked during the same period of time. On read commands, the idle codes are not read into storage.

In the OFF position, fill characters (idle code) are not generated.

System Attend/Unattend Switch (1051 Model 1 Only)

This switch must be in the ATTEND position for all on-line operations, or the 1051 will not indicate an operational condition to the 1051 attachment in the 2030.

1050 Intervention-Required Light (on 2030 System Control Panel)

This light is turned on whenever a command execution is terminated with an intervention-required condition. It is reset by the next 1050 read or write command, or by a 2030 system reset.

1050 Request Light (on 2030 System Control Panel)

This light is turned on whenever the 1050 request key on the 1052 is pressed. It is reset when attention status is recognized by the attachment and accepted into the unit status register.

I/O Assignment Switches

The I/O assignment switches transfer the various 1050 I/O devices to the desired 1050 loop, or they disconnect them from the 1050 completely. When the 1050 home loop is switched to on-line operation (CPU connect switch on), the devices that are to be made available to the CPU must have their switches in the HOME position.

Alternate-Code Key

When the alternate-code key is held down while a numeric key is pressed on the 1052, a 1050 control character is generated.

Alternate Code—Zero (Cancel): Whenever the alternate code key and the zero key are pressed, a unique cancel character is generated that terminates the keyboard entry with channel-end, device-end, and unit-exception statuses. The cancel character is not read into storage.

Alternate Code—Five (EOB): Whenever the alternate code key and the 5-key are pressed, an EOB (End-of-Block) character is generated. This initiates a normal end to the keyboard entry. The EOB character is not read into storage. The alternate code Six EOT (End-of-Transmission) produces the same functions as alternate code five (EOB).

For a description of other standard or optional 1050 lights, switches, and manual controls refer to *IBM 1050 Operator's Guide*, Form A24-3125.

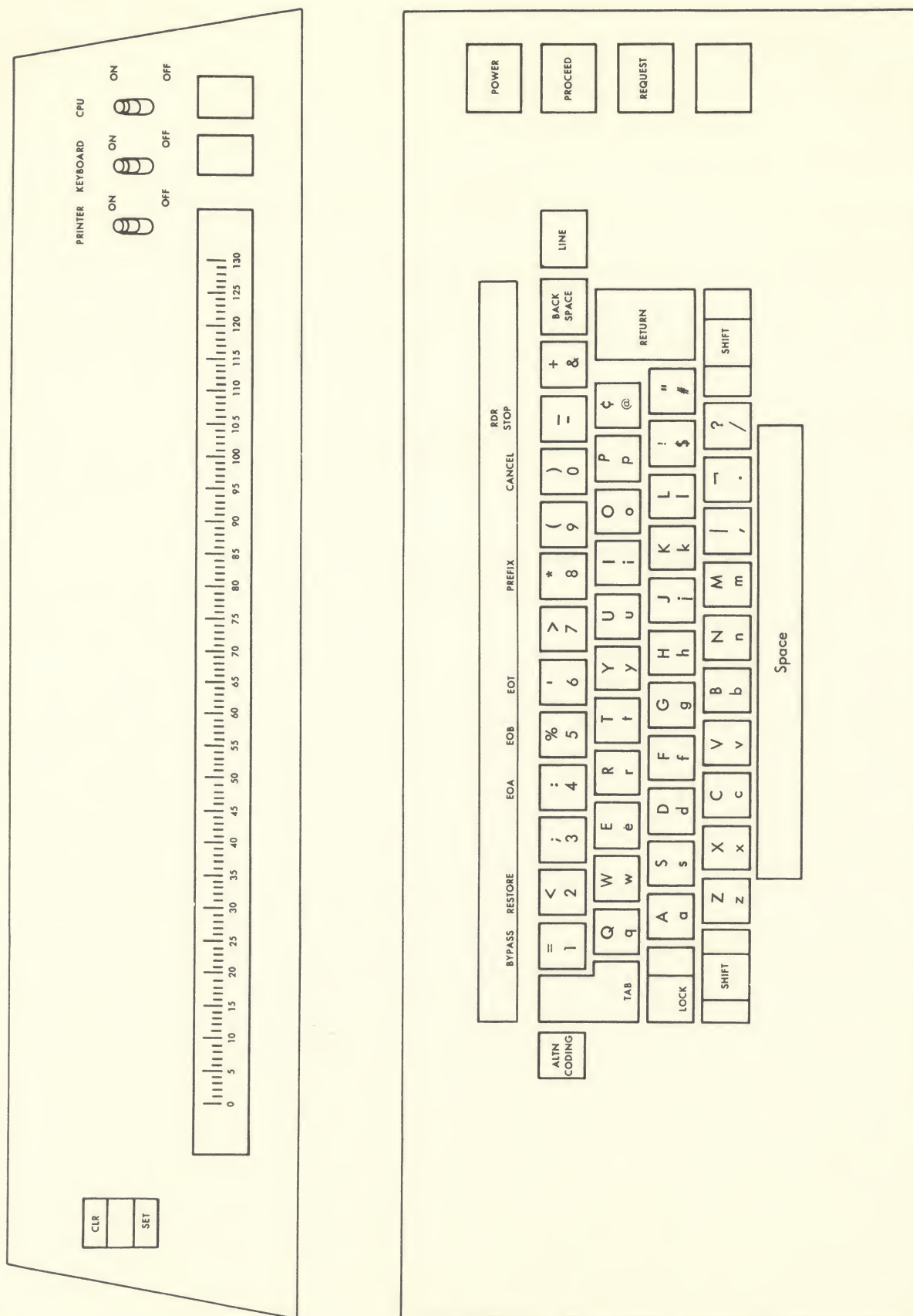
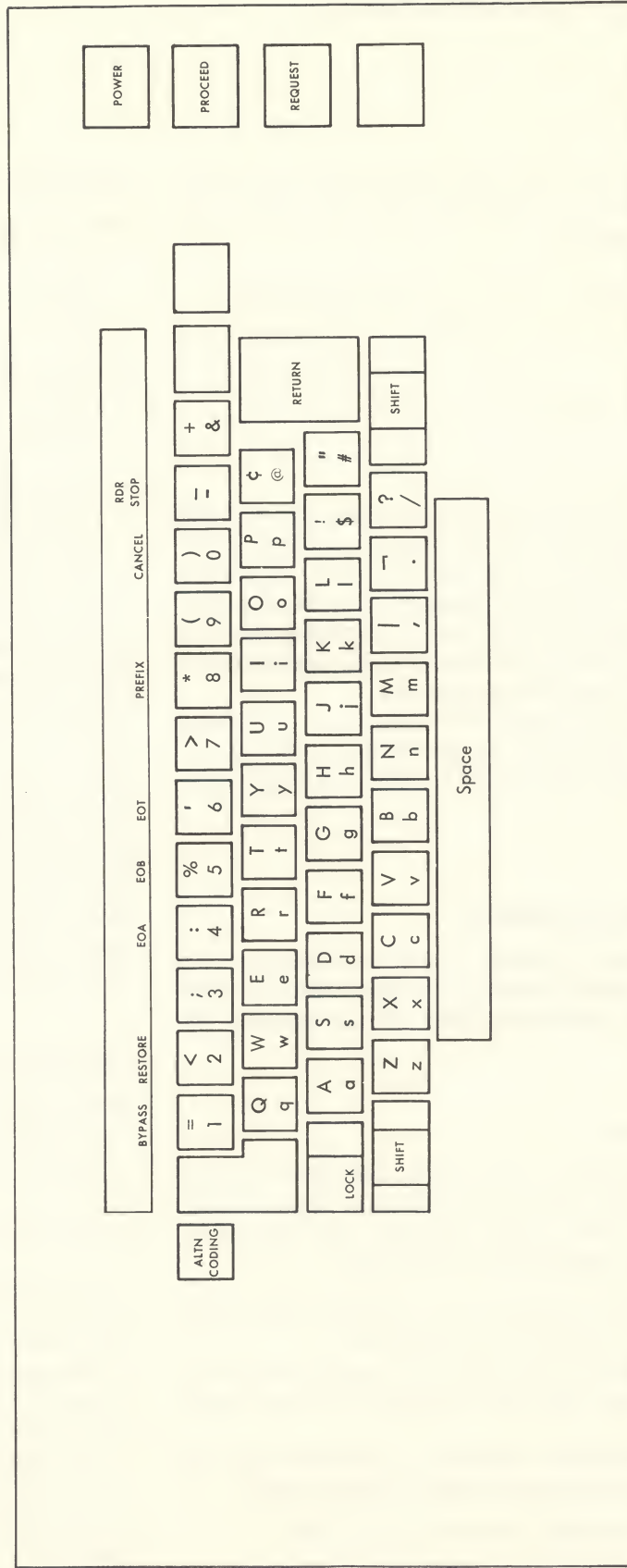
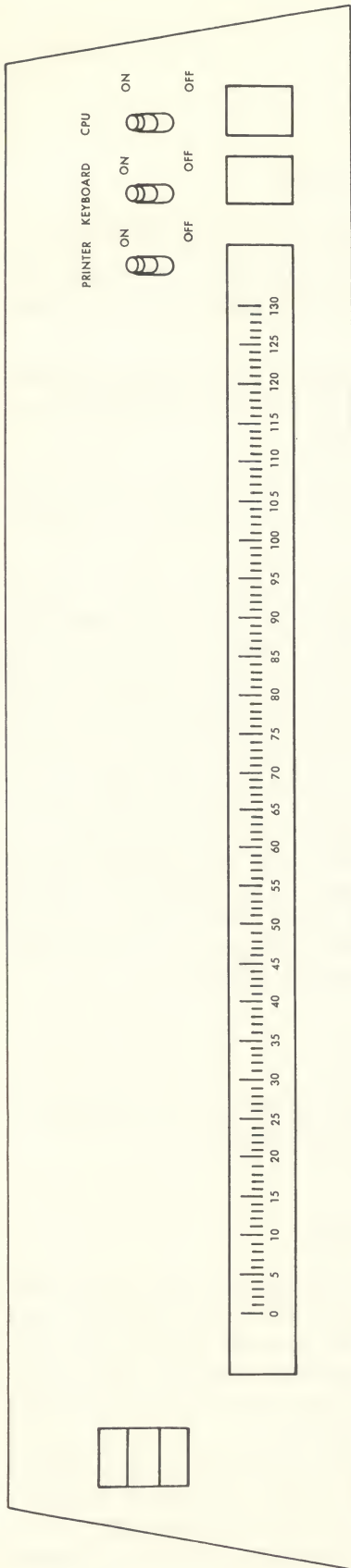


Figure 27. IBM 1052 Model 6 Keyboard and Switch Panel



● Figure 27.1 IBM 1052 Model 8 Keyboard and Switch Panel

Commands Initiated by Start I/O

The following is a list of the 1050 console home-loop commands executed from start I/O. The CCW command byte is shown.

Command	CCW Command Byte							
	Bits	0	1	2	3	4	5	6 7
Read Inquiry		0	0	0	0	1	0	1 0
Read Reader 2		0	0	0	0	0	0	1 0
Write		0	0	0	0	0	0	0 1
Write with Auto New Line		0	0	0	0	1	0	0 1
No-Op		0	0	0	0	0	0	1 1
Sense		0	0	0	0	0	1	0 0

The channel functions and checks associated with the START I/O instruction (CAW format checking, CCW format checking, etc.) are performed by the normal multiplexor channel microprograms. The data transfer, status manipulation, 1050 interface control, and control-unit and device-level functions are performed by unique 1050 console microprograms.

The following command descriptions, in general, cover the control-unit or device-level execution of initial selection, run or data transfer, and ending procedures.

Read Inquiry Command

This command is normally issued in response to an operator-initiated attention interrupt from the 1050 console. The operator initiates this by pressing the request key.

Initial Selection

If the 1050 power is off, or the 1050 CPU connect switch is in the OFF position (see switch interpretation under *IBM 1050 Lights, Switches, and Functional Keys*): or the attachment is in CE mode

- The START I/O instruction is terminated with condition code 3 (device not operational).

If the 1050 power is on, the CPU connect switch is in the ON position, and the attachment is in run mode and idle:

1. The read-inquiry command is initiated and the operation is terminated with condition code 0.
2. The proceed light is turned on at the 1052.
3. The 1052 keyboard is unlocked, and a holding or interlock condition is removed from Reader 2.

Operator Initiation of Inquiry

When the proceed light comes on, the operator can:

1. Enter data from the keyboard after making sure that the keyboard switch is in the HOME or ON position.
2. Enter data from Reader 2 by pressing the home-reader start key. The Reader-2 switch must be in the HOME or ON position.
3. Enter split data: in other words, enter data alternately from the keyboard and reader (either paper tape or card).

Either keyboard data or reader data can be entered first but for this example let us assume keyboard data is entered first. The desired data is entered from the 1052 keyboard. Data entry from the reader is then initiated by pressing the home-reader start key on the 1052 (the Reader-2 switch on the 1052 must be in the HOME or ON position). Once the reader start key is pressed, the 1052 keyboard is locked. Data transfer from the reader is stopped and the keyboard is unlocked by either a reader stop code punched in the card (or perforated tape) or by pressing the home-reader stop key on the 1052. This process can be repeated until an ending operation is initiated from either the keyboard, reader, or channel.

Operation Checking

During the read inquiry operation, the attachment is checking for the following conditions:

1. 1050 power on, and
2. CPU connect switch on.

If any one of these conditions is not satisfied, the operation is terminated with an I/O interrupt with channel end, device end, and unit check in the CSW. A subsequent sense operation indicates intervention-required (bit 1 of the sense byte). The 1050 intervention-required light is turned on.

The keyboard is then locked, the proceed light is turned off, and a hold condition is returned to Reader 2. An automatic carrier return and line feed are attempted to monitoring printers, *attempted* because conditions may prevent the carrier return and line feed (for example, 1050 power off).

End Operation: End of Block Character (Normal End)

From Keyboard

The End-of-Block (EOB) character is supplied from the keyboard by pressing first the alternate code key and then the 5-key while still holding down the alternate code key. EOT (that is, 6-key) functions in the same manner as EOB.

From Reader 2

For paper-tape reading, the EOB character must be punched in paper tape immediately after the last data character to be transferred to storage. For card reading, the EOB character can be punched in the card or generated by the trailing edge of the card (whichever occurs first).

The EOB character is not read into storage. Channel-end and device-end status and an interrupt condition are established. The proceed light is turned off. The keyboard is locked. A hold condition is placed on Reader 2. An automatic carrier return and line feed is initiated to any 1050 printer copying the input. The EOT (End-of-Transmission) character (alternate code/6) is an alternative to EOB and functions in the same manner as EOB.

End Operation: CCW Byte Count Zero, No Data Chaining (CDA)

This is a channel-initiated end. If the data was being entered from the keyboard, the proceed light is turned off, the keyboard is locked, a hold condition is placed on Reader 2, and channel-end and device-end status and an interrupt condition are established. An automatic carrier return and line feed is initiated to any 1050 printer copying the input.

If the data was being read from Reader 2, a channel-end status and an interrupt condition are established. The attachment remains busy until EOB is detected. No more data characters are then transferred to storage. If the count was N, and data is from the keyboard, the N+1 character prints (if a printable character) but is not transferred to storage. If data was being entered from Reader 2, all printable characters up to EOB/EOT print (unless the printers are deselected or in the bypass mode).

At EOB, device-end status and an interrupt condition are established. The proceed light is turned off. The keyboard remains locked. A hold condition is placed on Reader 2. An automatic carrier return and line feed is initiated to any 1050 printer copying the input.

End Operation: Cancel Operation

A cancel operation can be initiated from the keyboard during a read inquiry at any time after the proceed light comes on, provided the keyboard still has control (the reader start key has not been pressed). A cancel operation is executed by pressing the alternate code key and the zero key while still holding the alternate code key down.

The read inquiry operation is then terminated. Channel-end, device-end, and unit-exception status and an interrupt condition are established. The proceed light is turned off. The keyboard is locked, a hold condition is placed on Reader 2, and an automatic carrier return and line feed is initiated. The cancel character is not transferred to storage. Programming determines what is done to the data characters transferred to storage *before* the cancel character is generated.

Read Reader 2 Command

This read command is a non-operator solicited read command directed specifically to Reader 2.

Initial Selection

If any of the following conditions exist, the START I/O instruction is terminated with condition code 3 (device not operational):

1. 1050 power off or 1050 CPU connect switch off.
2. Reader-2 switch is not in the HOME or ON position, or Reader-2 interlocks are not satisfied.
3. Attachment is in the CE mode.

If the above conditions do not exist (1050 is operational and Reader 2 is selected and ready), the read-reader-2 command is accepted and initiated and:

1. The START I/O instruction is terminated with condition code 0.
2. Reader 2 is automatically started.
3. The keyboard remains locked.

Operation checking

During the read-reader-2 operation, the attachment is checking for the following conditions:

1. 1050 power on,
2. CPU connect switch on,
3. Reader-2 switch ON or HOME, and Reader-2 interlocks satisfied.

If any of these conditions are not satisfied, the operation is terminated with channel-end, device-end, and unit-check. Intervention required is presented in bit 1 of the sense byte if a subsequent sense operation is executed. The 1050 intervention-required light is turned on. Reader 2 is stopped without advancing to the EOB character. An automatic carrier return and line feed are attempted to any 1050 printers selected to copy the input.

End Operation

1. *End of Block (EOB) Character.* For paper tape, the EOB character must be punched in paper tape. For cards, the EOB character can be punched in the card or is generated by the trailing edge of the card (whichever occurs first).

The EOB character is not read into storage. Channel-end and device-end status and an interrupt condition are established (assuming no command chaining). Reader 2 is stopped and a hold condition is returned to it. The keyboard remains locked. An automatic carrier return and line feed is initiated to any 1050 printers selected to copy the input. EOT functions in the same manner as EOB.

2. *CCW Byte Count Zero (No CDA).* This is a channel-initiated end. A channel-end status and an interrupt condition are established. The attachment remains busy until EOB is detected. No more data characters are then transferred to storage.

At EOB, device-end status and an interrupt condition are established. Reader 2 is stopped and a hold condition is returned to it. The keyboard remains locked. An automatic carrier return and line feed are initiated to any 1050 printers selected to copy the input.

Write Commands

Initial Selection

If any of the following conditions exist, the START I/O instruction is terminated, rejecting the write command with condition code 3 (device not operational):

1. 1050 power is off or 1050 CPU connect switch is off.
2. The attachment is in CE mode.

If the foregoing conditions do not exist (1050 is operational and home-loop is on-line), the write command is accepted and initiated and:

1. The START I/O instruction is terminated with condition code 0.

2. The keyboard remains locked.
3. A hold condition is maintained on Reader 2.

Operation Checking

During write operations, the attachment is checking for the following conditions:

1. 1050 power on,
2. CPU connect switch on,
3. Any output selected and ready.

If any of these conditions are not satisfied, the operation is terminated with the channel-end, device-end, and unit-check. A subsequent sense operation indicates intervention required (sense bit 1). If card punching was in progress, the card is not released. An automatic carrier return and line feed are attempted to any 1050 printers selected to copy.

End Operation

The end operation is initiated by the CCW byte count going to zero. Channel-end and device-end status and an interrupt condition are established (assuming no command or data chaining). If an automatic carrier return and line feed was specified in the write command, it is initiated to any 1050 printer selected to copy.

If a card punch was selected, one of the following must be provided at the end of the data field by the program to release the last card:

1. EOB character (pluggable option in the 1057 to function — release — but not punch, or function — release — and punch in the card).
2. A prefix character followed by an H.

Carrier Return

When operating on-line, if the carrier reaches the right margin without a carrier return signal from the program, the carrier returns automatically and a single line feed occurs. Printing is suppressed during the carrier return.

Sense Command

There are no 1050 conditions to be tested for acceptance of a sense command. The sense byte is assembled by the attachment and is transferred to storage, and the operation is terminated. Channel-end and device-end status and an interrupt condition are established.

Sense Byte

Bit	Condition
0	<i>Command Reject</i> — a command not valid to the 1050 console was detected during the previous START I/O instruction, or an attempt was made to command-chain.
1	<i>Intervention Required</i> — The previous command could not be performed or completed, and some type of manual intervention is required. Conditions such as the following cause intervention required: <ol style="list-style-type: none">1. 1050 power is off.2. No output device is selected or ready (write command).3. CPU connect switch is off.4. Attachment is in CE mode.5. Reader-2 is not selected and ready (read Reader-2 command).6. Attend/unattended switch is in UNATTEND position (1051 Model 1 only).
2	<i>Bus-Out Check</i> — Not used.
3	<i>Equipment Check</i> — A data error was detected during a read operation, or an equipment malfunction was detected.
4-7	Not used.

NO OP Command

The NO OP is a control-immediate-type command that performs no 1050 attachment or device level function. If the subchannel and 1050 attachment are not busy, the NO OP is executed. No additional 1050 attachment or device level checking is performed (that is, the 1050 need not be operational for the NO OP to be executed). If the command chaining flag is not on, condition code 1 is set and channel end and device end statuses are presented in the channel status word (CSW). If the command-chaining flag is on, condition code 0 is set and chaining is subsequently attempted to the next command.

1057 Considerations

The 1057 remains in upper- or lower-case mode at the end of each operation, depending upon the case of the last character punched. If the 1057 is left in upper-case mode (at the end of an operation) and the first character of the next write command is a lower-case character, the 1057 punches the intended lower-case character in upper-case code.

Therefore, programs should be written so that the last character of each message is known. Alternately, a downshift character may be entered as the first character of each message.

Home Component Recognition

This function requires the Home Component Recognition feature in the 1051. With the Home Component Recognition feature and the 1051 program duplicate switch in the PROGRAM position, the program can select and deselect any combination of 1050 output devices in the home loop and change the selection at any point in a given write operation.

Write Commands

With the Home Component Recognition feature in the 1051, the write commands function as follows.

Initial Selection Initiated by Start I/O Instruction

Printer 1 (either 1052 or 1053) is automatically selected.

Execution of Write Commands

If the write data is to be directed to an output device or devices other than Printer 1, the initial data bytes must consist of the required prefix-character numeric-character (recognition codes) sequences to turn on the desired output devices followed by prefix character and numeric 5 to turn off Printer 1.

As an example, assume the output data is to be copied on Printer 2 and Punch 2.

The output data, then, is: Prefix 2 Prefix 4 Prefix 5 TEXT. Printer 1 is turned off by the Prefix 5 sequence. The text output is copied by Printer 2 and Punch 2.

If the write data is to be directed to another output device or devices in addition to Printer 1, the initial data bytes must consist of the required prefix character numeric-character sequences to turn on the desired output devices.

As an example, assume the output data is to be copied on Printer 1 and Punch 2.

The output data is Prefix 4 TEXT. The text is copied by Printer 1 and Punch 2.

Output-device switching can be initiated at any point within the data stream of a given write command regardless of data chaining. The new output devices must be prefixed on before all of the previous output devices are prefixed off.

Output-select and ready-testing are performed during the execution of all write commands. If at any point during the execution, no output device indicates select and ready (not switched to HOME or ON, home-

component-recognition latches not on, or interlocks not satisfied), the operation is terminated with unit-check status.

End Operation

At the end of each write command, all 1050 output devices are deselected (all output home-component select latches are reset off).

Read Inquiry Command

With the Home Component Recognition feature active in the 1051, the read inquiry command functions as follows.

Initial Selection Initiated by Start I/O Instruction

Printer 1 (either 1052 or 1053) is automatically selected for monitoring.

Execution of Read Inquiry Command

If the operator desires another or an additional output to monitor during the inquiry operation, he can:

1. Prefix outputs on and off from the keyboard before entering data, or
2. Put the PROG/DUP switch in the DUP mode and manually switch-select the desired monitoring outputs. (He must return the switch to program mode before entering EOB.)

If the operator presses the home reader start key to enter his inquiry from Reader 2, the adapter continuously tests for Reader 2 select-and-ready during that portion of the inquiry operation.

End Operation

At the end of each read inquiry command, all 1050 output devices are deselected.

Read Reader-2 Command

With the Home Component Recognition feature active in the 1051, the read reader-2 command automatically selects Printer 1 for monitoring the input. If no monitoring is desired, the prefix sequence to deselect the printer must be punched in the first card for each command or the Printer 1 assignment switch must be turned off.